Preserving, Enhancing, and Continuing the Scientific Legacy of the Apollo Sample Suite

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From 1969 to 1972, Apollo astronauts collected 382 kg of rocks, soils, and core samples from six geologically diverse locations on the Moon. In the nearly 50 years since the samples were collected, over 3000 different studies have been conducted using the nearly 2200 different Apollo samples. Despite the maturity of the sample collection, many new studies of lunar samples are undertaken each year, with an average of >55 requests and >600 distinct subsamples allocated annually over the past five years.

The Apollo samples are a finite resource, however. Although new studies are encouraged, it is important that new studies do not duplicate previous studies, and where possible, leverage previous results to inform and enhance the current studies. This helps to preserve the samples and scientific funding, both of which are precious resources.

We have initiated several new efforts to rescue some of the early analyses from these samples, including unpublished analytical data. We are actively scanning NASA documentation in paper form that is related to the Apollo missions and sample processing, and we are collaborating with IEDA to establish a geochemical data base called MoonDB. To populate this database, we are actively working with about a dozen prominent lunar PIs to organize and transcribe years of both published and unpublished data, making it available to all researchers. This effort will also take advantage of new online analytical tools like PetDB.

There have already been tangible results from the MoonDB data rescue effort. A pilot project involving the rescue of geochemical data of John Delano on Apollo pyroclastic glasses has already been referenced in multiple Apollo sample requests, and in fact, the compiled data was used as part of one of the new studies. Similarly, scanned sample handling reports have been utilized to find previously analyzed samples that were appropriate to fulfill new sample requests.

We have also begun to image the Apollo samples using (1) micro-CT scanning to document the interior structure of samples, and (2) comprehensive high resolution photography of samples, enabling high resolution 3D reconstructions of the samples. Both efforts will provide comprehensive access to these samples and allow for more targeted requests, and thus better curation of the samples for decades to come.